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Original Article

Root Cause Analysis of Patient Safety Incidents in Pediatric Anesthesia and Consequences of the Second Victim Phenomenon

Pediatrik Anestezide Hasta Güvenliği Olaylarının Kök Neden Analizi ve İkinci Mağdur Fenomeninin Sonuçları

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ABSTRACT

Objective: This study investigates the root causes of patient safety incidents (PSIs), and the ensuing second victim phenomenon (SVP) among healthcare professionals involved in pediatric anesthesia. It also aims to analyze the impact of adverse events on healthcare professionals providing pediatric anesthesia and identify underlying factors contributing to these incidents.

Method: Using qualitative analysis, focus group discussions were conducted with twelve pediatric anesthesiologists. Thematic analysis was applied to the discussions using MAXQDA22 software, focusing on identifying root causes and consequences of SVP specific to pediatric anesthesia.

Results: The analysis revealed six primary root causes of PSI leading to SVP in pediatric anesthesia settings: individual, systemic, medical, administrative factors, legal responsibilities, and violence. The adverse consequences of SVP for healthcare professionals included psychological distress, self-doubt, and burnout, affecting both personal well-being and national healthcare outcomes because of unnecessary treatments and tests.

Conclusion: The study highlights the complex interplay of factors leading to PSI and SVP, underscoring the need for comprehensive strategies to address these root causes. Improving patient safety culture and supporting affected healthcare professionals are crucial for enhancing healthcare quality and safety on a global scale.

Keywords: Health and safety, quality in healthcare, qualitative research, quality improvement, second victim phenomenon

ÖZ

Amaç: Bu çalışma, pediatrik anestezi bağlamında hasta güvenliği olgularının (HGV) kök nedenlerini ve buna bağlı olarak sağlık çalışanları arasında ortaya çıkan ikinci mağdur fenomenini (İMF) araştırmaktadır. Çalışmanın amacı, pediatrik hastalarda advers olayların sağlık çalışanları üzerindeki etkisini analiz etmek ve bu olaylara katkıda bulunan temel faktörleri belirlemektir.

Yöntem: Çalışmada nitel araştırma yöntemi kullanılmış olup, pediatrik anestezi alanında çalışan on iki uzman doktor ile odak grup görüşmeleri gerçekleştirilmiştir. Görüşmeler, MAXQDA22 yazılımı kullanılarak tematik analiz yöntemi ile incelenmiş ve pediatrik anesteziye özgü HGV'nin kök nedenleri ile İMF'nin sonuçları belirlenmiştir.

Bulgular: Analiz sonucunda, pediatrik anestezi ortamında HGV'ye neden olan altı ana kök neden belirlenmiştir: Bireysel faktörler, sistemsel faktörler, tıbbi faktörler, idari faktörler, hukuki sorumluluklar ve şiddet olayları. Sağlık çalışanları için sonuçlar ise psikolojik stres, özgüven kaybı ve tükenmişlik olup, bu durum bireysel refahı etkilediği gibi, gereksiz tetkik ve tedaviler yoluyla ulusal sağlık sistemine de olumsuz yansımaktadır.

Sonuç: Çalışma, HGO ve İMF'nin ortaya çıkışındaki karmaşık etkileşimleri ortaya koyarak, bu kök nedenleri ele almak için kapsamlı stratejilere duyulan ihtiyacı vurgulamaktadır. Hasta güvenliği kültürünün geliştirilmesi ve etkilenen sağlık çalışanlarının desteklenmesi, küresel ölçekte sağlık hizmetlerinin kalitesini ve güvenliğini artırmak için kritik öneme sahiptir.

Anahtar kelimeler: Hasta güvenliği, sağlıkta kalite, nitel araştırma, kalite iyileştirme, ikinci mağdur fenomeni

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INTRODUCTION

Patient safety (PS) is a comprehensive concept involving the assessment, prevention, and management of potential risks that could negatively impact patients' health during the delivery of healthcare services. PS incidents (PSIs) refer to adverse events such as medical errors, side effects of treatments, and communication gaps that may occur among healthcare institutions and professionals. These incidents typically encompass various components of healthcare services, including medical interventions, medication administrations, surgical procedures, and patient communication[1].

PSIs may increase the likelihood of patients encountering unexpected and undesirable outcomes, exerting serious adverse effects on both healthcare professionals and patients. Recognizing, and effectively managing PSIs is critically important for improving the quality of healthcare systems and ensuring patients' trust. PSIs and near-miss events frequently occur in intensive care units (ICUs). PS holds particular importance in these units, where mortality rates are already high[2].

Second victim phenomenon (SVP) is used to describe the experiences of emotionally distressed healthcare professionals as a result of being involved in an event adversely affecting PS[3]. Professionals who experience SVP often fear legal proceedings arising from harm to the patient and damage to their professional reputation. They feel primarily responsible in such situations, doubting their clinical skills and knowledge[4]. Professionals exhibit not only emotional responses such as guilt, shame, anger, and fear but also display physical reactions such as insomnia and extreme fatigue[5].

Root cause analysis is a methodology used to understand the fundamental issues affecting a problem or an event and the relationships among these causes. This analysis aims not only to identify the apparent causes of a specific event but also to uncover the underlying root causes. Root cause analysis for PSI can contribute to understanding errors, deficiencies, and risks in healthcare systems, thereby helping to develop strategies to prevent similar PSIs in the future[6].

The primary aim of this study is to systematically analyze the root causes of SVP among pediatric anesthesiologists following occurrence of a PSI and to understand the factors that contribute to these adverse events. Root cause analysis reveals not only the surface causes of events but also the underlying systemic, organizational, or individual factors that lead to emergence of these events which make efforts to improve PS more effective by assisting healthcare providers and managers in identifying and resolving real underlying problems[7].

Root cause analysis can be used as a focal point for quality improvement efforts in the field of PS, guiding strategies to prevent the recurrence of errors in pediatric anesthesia and improve overall PS. This research is conducted to learn about the root cause analysis of unwanted incidents happening in pediatric anesthesiology and to understand the consequences of these incidents, leading to SVP.

MATERIALS and METHODS

In this study, a qualitative research approach was employed to understand the root causes of SVP following PSIs. Focus group discussions with twelve pediatric anesthesiologists were conducted to gain in-depth insights and gather various perspectives. The interviews were organized in three separate sessions, with each session consisting of a group of four participants. This grouping was designed to increase the rate of volunteer participation and ensure that participants felt comfortable during the interviews. Doctors actively serving in the field of pediatric anesthesia who volunteered to participate in the study were interviewed. Anesthesiologists who did not volunteer to participate and those not actively practicing their profession for the time being (being retired or on sick leave, etc.) were not included in the survey. Participants were selected using purposive sampling with the snowball method. Purposive sampling allows for in-depth research based on the objectives of the study[8]. The participants were convened under the moderation of a facilitator, and the data were transcribed by a rapporteur. The sessions of focus group discussions took 3.5 hours and data saturation was achieved. Transcripts were returned to participants for their comments.

The analysis of the focus group discussions was conducted using MAXQDA22 qualitative software (Verbi Gmbh, Berlin, Germany). This software provides researchers with the opportunity to systematically and effectively analyze qualitative data. The opinions of the pediatric anesthesiologists were analyzed using thematic analysis, and the emerging themes were systematically categorized using the MAXQDA22 qualitative software. The names of all participants were anonymized. Through the use of computer-assisted qualitative data analysis software, detailed observations and in-depth

descriptions were performed while adhering to the criteria for ethical conduct, validity, and reliability of the research, also ensuring transparency. The report of this research study was prepared in accordance with the consolidated criteria for reporting qualitative research criteria[9].

The focus group discussions used in the study were designed to explore the observations, experiences, and opinions of healthcare professionals in depth. This method allowed for a more comprehensive understanding of pediatric anesthesiologists' perceptions and experiences regarding PSI. As a result, this research aims to understand the root causes of PSI from the perspective of pediatric anesthesiologists using qualitative data collection and analysis methods. This approach can be considered as an important step in identifying and improving safety gaps in healthcare systems.

The study was conducted in accordance with the World Medical Association Declaration of Helsinki Ethical Principles for Medical Research Involving Human Participants and approved by the Ethics Committee of İzmir Democracy University (approval number: 2024/01-9, dated: 31.01.2024).

RESULTS

The study was conducted with seven female and five male volunteer pediatric anesthesiologists, all serving in the department of pediatric anesthesia. Only six participant anesthesiologists had experienced SVP. The average duration of clinical experience of all participants in anesthesia was 19.9 (±8.7) years. However, there was a statistically significant difference in the duration of clinical experience as anesthesiologist between those who had and had not experienced SVP (25.8±6.3 vs. 14.0±6.5 years; p=0.01). The demographic characteristics of the participants are presented in Table 1.

When examining the data obtained from focus group discussions conducted with healthcare professionals regarding their experiences of SVP following PSI, six themes emerged as root causes which can be classified as individual, systemic, medical and administrative factors, legal responsibilities, and incidents of violence.

Upon examining the consequences of SVP arising from PSI, we have observed that PSIs may be categorised into two main headings. The first one concerns with the effects of SVP on pediatric anesthesiologists, while the second one pertains to the broader i.e. nationwide implications of SVP (Table 2).

Main Theme I. Root Causes of the SVP Following PSI

The data obtained regarding the root causes of PSI leading to SVP were examined within the scope of healthcare workers' experiences as second victims. In this context, issues stemming from both individual and systemic factors, the impact of errors made by other staff members, the effects of patients' medical conditions, the turnover of personnel, and incidents of violence have emerged prominently, as illustrated in Figure 1.

Table 1. Demographic data of the study participants

Participants	Focus group number	Gender	Hospital units	Age (years)	Clinical experience (years)	SVP experience
1	1	Male	Operating room	42	12	No
2	1	Male	Critical care	36	6	No
3	1	Female	Critical care	48	15	Yes
4	1	Female	Operating room	48	19	No
5	2	Female	Critical care	55	24	Yes
6	2	Female	Critical care	58	27	Yes
7	2	Female	Critical care	61	31	Yes
8	2	Male	Critical care	56	25	Yes
9	3	Male	Operating room	45	16	No
10	3	Female	Critical care	62	33	Yes
11	3	Female	Operating room	53	23	No
12	3	Male	Operating room	39	8	No

SVP: Second victim phenomenon

Subtheme I. Individual Factors

Individual factors include; public ignorance and decreasing respect for the medical profession, burnout syndrome among healthcare personnel, and the consequences of preventive medicine. Most participants indicated that the primary underlying factors of the second victim incident (SVI) were public ignorance, doctors engaging in non-medical pursuits, and lack of time for reading, and emphasized their efforts to enhance their knowledge on preventive medicine.

• "Sometimes, due to the ignorance of the public." (Participant 1)

• "Physicians now engage in pursuits outside the medical profession and personal development, leading to the stagnation and failure to renew their medical knowledge. The burnout syndrome we are experiencing can sometimes push us into emptiness at the patient's bedside." (Participant 6)

• "There are opportunities where we can improve our knowledge of preventive medicine." (Participant 9)

• "Not being able to find time to read." (Participant 10)

Table 2. Main themes and subthemes of the analysis

Main themes	Subthemes
I. Root causes of the SVP following patient safety incidents	Individual factors Systemic factors Medical factors Administrative factors Legal responsibilities Incidents of violence
II. Consequences of the SVP following patient safety incidents	Consequences of the SVP on health care professionals Nationwide consequences of the SVP

SVP: Second Victim Phenomenon

Subtheme II. Systemic Factors

Systemic factors are underscored by a disrupted educational continuum. Participants detailed encountering complications rooted in these systemic issues, highlighting a shift where doctors increasingly divert their focus to activities beyond their medical practice, leading to a stagnation or decline in their basic professional knowledge.

• "But indirectly, complications occur because of the system, meaning that sometimes due to the problems in nursing care, the patient is not properly monitored, and some situations are overlooked. Generally, I don't blame myself, I blame the system." (Participant 5)

• "I think the broken education chain of doctors (starting with congresses) has been effective here for a long time. Physicians now engage in pursuits outside the medical profession and personal development, leading to the stagnation and failure to renew their medical knowledge." (Participant 8)

Subtheme III. Medical Factors

The impact of patients' medical conditions emerged prominently. One participant emphasized that acute medical conditions experienced by patients have a significant negative impact.

• "What affects me the most are the acute medical conditions experienced by patients; which make me feel bad. I have a lot of trouble when it comes to the patient. For example, we, the anesthesiologist, surgeon, nurse, and the whole team, were sued for cautery burns of a patient. This incident affected us so deeply that when a pediatric orthopedic patient with a slightly blurred consciousness transported to the operating room for anesthesia the other day, we wrapped all the iron parts of the arm splints, fearing that the child might involuntarily touch iron parts and get burned. So, that lawsuit affected us so much that we felt a strong obligation to take

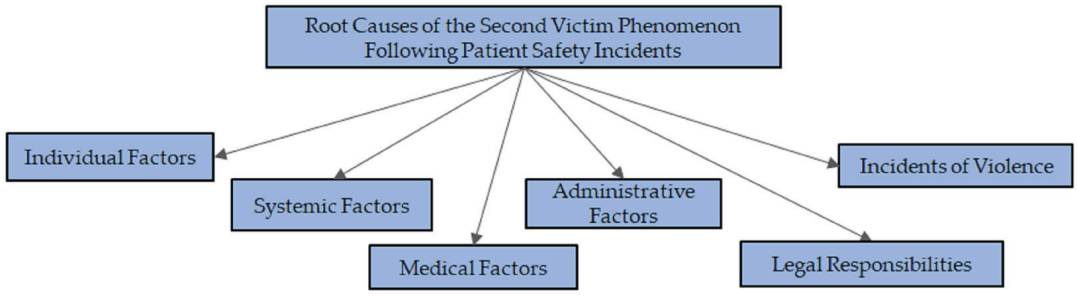

Figure 1. Root causes of the second victim incidents (MAXQDA 22-Hierarchical Code-Subcode Model)

very strict precautions in case a patient with impaired consciousness touches somewhere and gets burned. But these bad experiences do not prevent us from doing what needs to be done, of course, we reperformed the necessary procedure." (Participant 7)

Subtheme IV. Administrative Factors

Personnel turnover significantly affected the situation. A male participant stated that he rarely questioned himself much about patient's cause of death amidst high patient mortality rates, feeling unaccountable for outcomes like cardiac arrest due to medication errors made by the staff.

• "Most of the patients admitted to us have very high mortality rates. I don't question myself much about why the patient died or what more could I have done better. Few patients could benefit. Even in these fatalities, thankfully, we can't say that we did this major malpractice and lost the patient. What I've seen, of course, I can't blame myself for that either. For example, if I prescribe this medication to the patient, and the nurse mixes up the medications and, in the meantime, the patient who received the wrong medication goes into cardiac arrest, then I can't really blame myself as the primary culprit in that case. I don't think about whether I should have administered the medication myself. I don't want to think about the medication errors made by the auxiliary healthcare personnel either." (Participant 2)

• "Especially during the pandemic period, there was a high turnover of auxiliary staff. They were working without adapting themselves to the unit they were working in. Apart from the incidents that occurred during that period, I also think that the training of auxiliary healthcare personnel needs to be improved." (Participant 11)

Subtheme V. Legal Responsibilities

Errors made by colleagues notably influenced participants. One participant shared the idea of "how others' mistakes also affected them", prompting a sense of responsibility and efforts to understand the underlying cause.

• "The mistake made by someone else also affects you. A mistake made by a nurse, a technician, or a staff member can cause harm to the patient. In such situations, we try to solve it because we feel responsible, and at the same time, we try to understand why it happened. We experience intense distress in the meantime."(Participant 4)

Subtheme VI. Incidents of Violence

Incidents of violence stood out significantly. Within this context, participants articulated their feelings that these events were out of their control, acknowledging that mistakes could lead to violence, which profoundly affected them even to the extent of undermining their willingness to go to the hospital.

• "When I feel verbal or physical violence, the feeling I experience weighs heavier, it sticks with you, even if I have not been directly subjected to verbal or physical violence. But the thought of inducing adverse incidents during the procedure due to an intervention performed by myself is of course a bad feeling." (Participant 7)

• "Verbal abuse and physical assaults affect me more deeply." (Participant 8)

• "Verbal abuse affects me more profoundly. We do not engage in interventions that deliberately have a negative impact on patients. Medical errors happen. Of course, we are extremely careful to avoid adverse events, but drug interactions are not within our control. Of course, we feel sad, we wish it hadn't happened, but when I experience verbal or physical abuse after putting in so much effort, I immediately become disillusioned with the profession. I don't even want to come to the hospital, to be honest." (Participant 10)

Main Theme II. Consequences of SVP Following PSI

The consequences of SVP emerged prominently, both in terms of its nationwide effects and its effects on healthcare personnel, as depicted in Figure 2.

Subtheme VII. Consequences of SVP on Healthcare Professionals

When examining the data on the consequences of SVP on specialist doctors, most participants expressed experiencing psychological issues and self-doubt.

• "I'm currently trying to monitor patients non-invasively. Indeed, there were times when I questioned myself during invasive interventions." (Participant 1)

• "Of course, sometimes we question what we're doing. I'm a very questioning person. While I do this questioning every 10 patients, someone with a very relaxed character may not even feel that concern, even if they make a mistake. I think it's somewhat of a personal matter." (Participant 5)

• "You know, maybe we don't leave much room for error for ourselves here, but if we were to expose the patient to the same thing the second time, maybe I could see myself as experiencing SVP." (Participant 2)

• "I blamed myself a bit on that." (Participant 6)

• "From the first patient onwards, your morale is down. Then you examine 50 more patients working without a secretary during these processes. You start questioning why you became a doctor. I think doctors are the ones who suffer the most in these kinds of discussions." (Participant 7)

However, participants also expressed feelings of anxiety, unrest, and burnout as a result of experiencing SVP:

• "I feel such anxiety when I see a patient with a circulatory disorder due to a bad experience I had during my residency. It's not easy to shake it off." (Participant 8)

• "You feel restless because you've done too much." (Participant 10)

• "The burnout syndrome we're in can sometimes push us into a void at the bedside." (Participant 11)

Ultimately, pediatric anesthesiologists highlighted that the SVP leads to the formation of a discontented cohort, underscoring the systemic roots of this distressing condition:

• "Doctors who were equipped priorly with essential medical knowledge, and also renewed themselves and thought only about the patient and medical issues are extinct. There's a completely different group now, dealing with various issues like medical secretarial work, performance anxiety, burnout syndrome, and pondering over different cases." (Participant 2)

• Of course, this unhappy group expresses its feelings towards the problem of victimization in two ways as exemplified below:

• Yes, I admit that I have shortcomings concerning this issue." (Participant 7) or

• "There is a faulty system that drives me to experience these things, so I don't criticize myself at all, in fact, I am justified, I am not at fault at all. There is a system that hinders my development, that demands irrelevant things from me." (Participant 8)

Subtheme VIII. Nationwide Consequences of the SVP

A study participant noted that to prevent SVP, extra treatments and unnecessary tests are sometimes conducted to preclude negative responses from patients' families:

• "There are situations where excessive treatment is administered, which also burdens the country's economy." (Participant 9)

• "Sometimes, unnecessary tests are ordered, and antibiotics are prescribed to avoid reactions from patients' families." (Participant 11)

World Cloud Analysis

A word cloud was generated to visually represent the frequency and distribution of key terms identified during the focus group analysis (Figure 3). This visualization highlights the most frequently mentioned terms, as detailed in Table 3, and their impact on professional experiences and systemic issues in healthcare. The top 15 words, listed in descending order of frequency, emphasize the primary stressors and challenges faced by healthcare providers, with keywords "patient," "care," and "safety" leading the list.

DISCUSSION

The root cause analysis employed in this survey elucidates the multifaceted experiences pediatric anesthesiologists experiencing PSI face. It categorizes

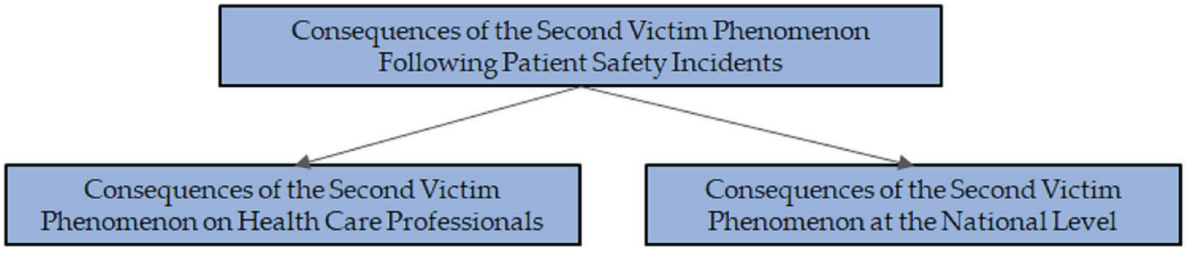

Figure 2. Consequences of the SVP (MAXQDA 22-Hierarchical Code-Subcode Model)

SVP: Second Victim Phenomenon

Figure 3. Word cloud depicting the most frequently used terms in focus group discussion

Table 3. The top 15 words, frequency counts, and percentages within the top words subsets			
Order of frequency	**Words**	**Frequency counts**	**Top 15 words (%)**
1	Patient	20	13.2
2	Care	18	11.8
3	Safety	12	7.9
4	Affect	11	7.2
5	Lack	11	7.2
6	Mistake	10	6.6
7	Adverse	9	5.9
8	Victim	9	5.9
9	Feel	8	5.3
10	System	8	5.3
11	Error	8	5.3
12	Issue	7	4.6
13	Violence	7	4.6
14	Impact	7	4.6
15	Legal	7	4.6

the underlying factors into six distinct themes for comprehensive understanding. Individual factors encapsulate professionals' competencies, experiences, and communication skills, highlighting the personal dimension of PSI. Systemic factors reveal organizational and structural flaws within healthcare systems, pointing to broader institutional issues. Medical reasons include clinical factors such as medical errors, malpractices, diagnostic shortcomings, and treatment planning intricacies. Administrative factors are related to management policies and procedures. Legal responsibility underlines the significant influence of regulatory practices on PS, whereas incidents of violence draw attention to threats endangering workers' physical and emotional well-being.

The most frequently used terms according to the word cloud analysis emphasize the central role of patient care and safety in discussions about SVP and the influence of systemic factors such as "lack" and "support" on healthcare outcomes. The distribution of these words reflects that healthcare professionals see patient-centered care and safety as paramount issues, but systemic deficiencies, personal stress, and legal pressures create barriers to fulfilling these duties effectively. This interpretation suggests a need for focused interventions that address both external (systemic support) and internal (psychological well-being) dimensions to foster a safer and more supportive work environment for healthcare providers.

The results have shown that more experienced anesthesiologists were significantly more likely to have encountered SVP in their professional careers. With increased years in practice, they more frequently experience PSIs, making seasoned professionals more vulnerable to SVP. Anesthesiologists assuming

leadership roles often bear greater responsibility for patient outcomes, experiencing their feelings of self-blame and emotional distress related to adverse events more intensely. Additionally, cumulative exposure to medical errors over time may amplify psychological burdens, making experienced anesthesiologists more susceptible to guilt, anxiety, and professional self-doubt. Unlike early-career clinicians who may attribute complications to systemic factors, senior anesthesiologists often perceive greater personal accountability, exacerbating their distress. These findings highlight the need for continuous psychological support tailored to experienced professionals. While younger novice anesthesiologists receive mentoring, senior practitioners often face greater professional isolation and may hesitate to seek help due to workplace norms discouraging emotional vulnerability.

Analyzing the aftermath of PSI and SVP, it's evident that the primary impact is on pediatric anesthesiologists, manifesting as psychological trauma, professional discontent, and diminished job satisfaction. On a broader scale, these incidents erode national confidence in the healthcare system, deteriorate public trust, and provoke legal ramifications.

Research has shown that medical errors are more common in ICUs and that PS needs to be more closely monitored in such settings[10]. According to a study, a life-threatening event more frequently (29%) occurs during a patient's stay in the ICU. Another study found that the rate of medical errors in medical-surgical ICUs was 1.7 per patient per day. These high rates of medical error may contribute to the more frequent occurrence of SVP among healthcare professionals working in ICUs[11].

Limited research has delved into the foundational causes of medical errors. A study segmented the origins of PSI that led to medical harm into three principal categories. Human factors were foremost, with elements like fatigue, insufficient training, communication gaps, time constraints, decision-making mistakes, logical errors, and abrasive personalities all contributing to this category. The second category, institutional factors, includes issues related to workplace design, policy implementation, administrative and financial frameworks, leadership dynamics, shortcomings in resource allocation, and mismanagement of staff. The third category encompasses technical factors, such as the lack of adequate technology, malfunctioning or subpar equipment, insufficient decision-making support, and integration deficits[12]. Our investigation corroborates that these individual, organizational, and technical dimensions significantly influence the incidence rates of medical errors and the emergence of SVP.

A study on PS in ICU indicated that medical errors arise not only from personal but also from technical and administrative factors. Due to these factors beyond the control and intervention of healthcare personnel, greater stress and pressure may arise. Therefore, medical errors should not be perceived as personal mistakes and healthcare providers should not be blamed, and punished accordingly. Instead, efforts should focus on reducing the sense of pressure, increasing frequency of reporting errors, and improving the system to prevent occurrence of these medical errors[13].

Root cause analysis plays a crucial role in devising effective strategies to combat PSI and foster improvements in the healthcare sector. This analytical method focuses on pinpointing the underlying causes of errors and developing interventions to prevent their recurrences. A study presented two illustrative scenarios of medical errors, thoroughly dissecting their root causes. In the first scenario, a miscommunication led to the erroneous administration of a blood thinner (warfarin sodium) to the wrong patient due to a last-minute room switch and a failure in identity verification of the patient which necessitated the cancellation of the scheduled surgery of the patient. The subsequent root cause analysis unveiled several underlying issues: inadequate training and orientation for healthcare staff, lack of experience, pervasive communication gaps among medical personnel, teamwork discrepancies, neglect in confirmation of the patient's identity, and general oversight. The second scenario depicted an accident where a janitor was wounded with a needle protruding from a medical waste bag. This incident, occurring three months previously during the janitor's shift, was promptly reported to the unit supervisor and then to the employee safety committee. Analysis of this scenario pinpointed critical safety concerns: insufficient training of new employees, the oversight of mandatory vaccinations upon employment commencement, and inadequate use of personal protective equipment. Identification of these root causes facilitated the development of specific prevention strategies targeted at each identified issue which underscores instrumental role of root cause analysis in mitigating risks associated with PSI and improving safety protocols for both patients and healthcare workers, thereby reinforcing the overall integrity and efficacy of the healthcare system[14].

A descriptive study was conducted at a university hospital to determine the frequency and root causes of commonly encountered patient falls. It was reported that 32.8% of falls occurred within the first three days of hospitalization, and 36.1% of them between 04:01 a.m. and 08:00 a.m. The hospital fall rate was determined to be 0.33%, with the highest rate observed in the neurology clinic. The identified causes for falls were associated with patient distraction and inattention (32.8%), his/her physical condition (32.8%), and lack of an attendant (22%). Using tree diagrams, a total of 241 root causes were identified and classified for each fall incident, with 3-4 root causes were identified for each event. The majority of falls occurred due to patient-related factors (45%), non-compliance with rules (23%), technical errors (15.8%), and organizational failures (8%). In light of these results, it was recommended to use a fall risk assessment scale to identify causes of falls in high-risk or fallen patients and implement appropriate, and individualized preventive measures[15]. In this context, establishing fall and risk assessment committees, monitoring falls at the institutional level, evaluating outcomes, and developing measures are critically important issues. These root cause analyses can improve the quality of healthcare delivery and reduce the incidence of SVP.

Another study aimed at decreasing PS events examined fall incidents in the hospital. In this study, root cause analysis was conducted using the fishbone diagram method. This method visually presents the causes of the problem, using statistical methods and analyzes results to identify the causes of the event and demonstrate the cross-relationships between the results and the underlying causes. The head of the fish represents the main problem. The fishbone diagram typically progresses from right to left, with more detail shown in smaller bones, allowing each major bone to branch out when further details are examined. The detailed analysis of the problem is carried out in four steps: clarifying the main problem, developing a fishbone diagram by defining sub-dimensions, while incorporating stakeholder analysis, and creating an unbiased view based on problem analysis[16]. A fall incident that occurred during the patient's transfer to the operating room was examined using the fishbone diagram method. An action was developed for all identified root causes (such as the three-level locking system of the patient bed in use, the unexpected failure of these locks, lack of competence in using the patient bed by staff, inadequacy of the assigned female staff for lifting and transport of the patient), and a person responsible for implementing the action was appointed which aimed to prevent future unwanted (sentinel) events and SVP[17].

Another factor that influences the PS Culture has been identified as the prevalence of illegitimate tasks performed in a hospital. The findings of the study underscore the association between the frequency of perceived illegitimate tasks, and duties regarded as unnecessary or outside one's professional responsibilities- with their relevant negative outcomes. Specifically, the perception of a higher frequency of illegitimate tasks was linked to a higher risk of reporting a low safety rating within hospital units and a higher likelihood of completing safety event reports which suggests that addressing the prevalence of illegitimate tasks could be a crucial step toward enhancing PS and improving the overall working conditions for healthcare professionals[18].

Regardless of the cause, experiencing an adverse event is stressful for healthcare professionals and reduces their work efficiency, and productivity. A cross-sectional study conducted in the Republic of Colombia covering the period from 2017 to 2021 highlights the prevalence and consequences of acute stress among healthcare workers following adverse events[19]. This study, which surveyed 838 healthcare professionals across various Colombian regions, found that 33.8% of respondents experienced adverse events, leading to significant stress reactions. Specifically, 21.91% of these professionals reported experiencing medium-high emotional overload, and 3.53% faced extreme acute stress. The findings underscore the substantial psychosocial risks healthcare workers face, underscoring the imperative for health institutions to proactively address these issues within the framework of PS and occupational health programs.

To improve the PS culture in institutions, it is necessary to first openly declare incidents of medical error and conduct root cause analyses. In cases where discussing medical errors is not encouraged, these errors are often covered up, and solutions cannot be developed. This study addresses the root causes of SVI experienced by expert physicians and the nationwide consequences of these incidents, and their impact on healthcare professionals. The study findings contribute to understanding the challenges and areas for improvement in the healthcare sector.

Improving PS culture in healthcare institutions requires an initial step of transparently acknowledging medical errors and thoroughly undertaking detailed root

cause analyses. In environments where open discussions about mistakes are discouraged, medical errors tend to be concealed, obstructing the development of effective solutions. This study examines the underlying reasons for SVI as encountered by pediatric anesthesiologists, while exploring the impact of these incidents on healthcare workers and the broader national healthcare landscape. The insights garnered shed light on the existing challenges and pinpoint crucial opportunities for advancement in the healthcare domain, aiming to foster a culture of safety and continuous improvement.

CONCLUSION

In conclusion, this article provides an important foundation for making improvements in healthcare systems by examining the complexity and various causes of SVP. The findings from this study can shed light on future research focusing on issues that affect the daily practices of healthcare professionals, while offering solutions to these problems.

Ethics

Ethics Committee Approval: The study was conducted in accordance with the World Medical Association Declaration of Helsinki Ethical Principles for Medical Research Involving Human Participants and approved by the Ethics Committee of İzmir Democracy University (approval number: 2024/01-9, dated: 31.01.2024).

Informed Consent: Informed consent was obtained from all subjects involved in the study.

Footnotes

Author Contributions

Surgical and Medical Practices: A.G.A., P.A., Concept: A.G.A., P.A., Design: A.G.A., P.A., Data Collection or Processing: A.G.A., P.A., Analysis or Interpretation: A.G.A., P.A., Literature Search: A.G.A., Writing: A.G.A., P.A.

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